

10/2/17

"Success is not final, failure is not fatal: it is courage to continue that counts"-Winston Churchill

HW: "2017 A2 CC Adding and Subtracting Radicals" #4-16 even, 30
 Test 2 on Monday 10/16

AIM: How do we Add/Subtract Radicals?

Warm Up:

1. $4\sqrt{81x^{16}y^8z^4}$

\downarrow
 $4 \cdot 9x^8y^4z^2$

$36x^8y^4z^2$

2. $\sqrt{250a^4b^5c^{13}}$

$\sqrt{25a^4b^4c^{12}} \sqrt{10b^1c^1}$

$5^2a^2b^2c^6 \sqrt{10bc}$

⊗ When simplifying radicals
look for the largest perfect
square factor.

⊗ Variables with EVEN exponents are perfect
squares

Adding and subtracting radicals is done in a similar manner as adding and subtracting polynomials. We need to combine like radicals. **Like radicals** are radicals that have the same index and the same radicand. Also the coefficients must be “like” to combine. It is often necessary to simplify radicals in order to tell if the radicals are like.

Examples; Perform the indicated operations.

$$6x - 4x = 2x$$

$$1. 6\sqrt{7} - 4\sqrt{7} = 2\sqrt{7}$$

$$2. 2\sqrt{5} + 9 - \sqrt{20}$$

Handwritten work shows simplification of $\sqrt{20}$ to $2\sqrt{5}$ using $\sqrt{4} \cdot \sqrt{5}$. The expression becomes $2\sqrt{5} + 9 - 2\sqrt{5}$. The $2\sqrt{5}$ and $-2\sqrt{5}$ terms are circled and crossed out, leaving the final answer 9 in a box.

$$3. \sqrt{125b} + \sqrt{12b} - \sqrt{45b} + \sqrt{75b}$$

Handwritten work shows factoring each radical into perfect squares and other factors: $\sqrt{25} \cdot \sqrt{5b}$, $\sqrt{4} \cdot \sqrt{3b}$, $\sqrt{9} \cdot \sqrt{5b}$, and $\sqrt{25} \cdot \sqrt{3b}$. This simplifies to $5\sqrt{5b} + 2\sqrt{3b} - 3\sqrt{5b} + 5\sqrt{3b}$. The like terms are grouped and simplified to the final answer $2\sqrt{5b} + 7\sqrt{3b}$ in a box.

$$4. \sqrt[3]{64x} - \sqrt[3]{8x} + \sqrt[3]{27x}$$

$$\begin{array}{l}
 5. \sqrt{250a^2} + \sqrt{10a^2} \\
 \begin{array}{cc}
 \sqrt{25a^2} \sqrt{10} & \sqrt{a^2} \sqrt{10} \\
 \downarrow & \downarrow \\
 5a\sqrt{10} & + a\sqrt{10} \\
 \boxed{6a\sqrt{10}}
 \end{array}
 \end{array}$$

$$6. \sqrt{24xa^2} + \sqrt{54xa^2}$$

$$\begin{array}{l}
 7. 2\sqrt{32x^2y^3} - xy\sqrt{98y} \\
 \begin{array}{cc}
 2 \cdot \sqrt{16x^2y^2} \sqrt{2y} & xy \sqrt{49} \sqrt{2y} \\
 2 \cdot 4xy \sqrt{2y} & xy \cdot 7 \sqrt{2y} \\
 8xy \sqrt{2y} & - 7xy \sqrt{2y} \\
 \boxed{xy \sqrt{2y}}
 \end{array}
 \end{array}$$

$$8. 2\sqrt{3y} - 5y^2 + 4\sqrt{3y} + \sqrt{36y^4}$$

$$9. \sqrt{63a^3} - \sqrt{45a^3}$$